

Purdue University
Purdue e-Pubs

LARS Symposia

Laboratory for Applications of Remote Sensing

1-1-1980

Mapping Growing Conditions of Crops from Landsat Data

P. Chagarlamudi

J. S. Schubert

A. R. Mack

Follow this and additional works at: http://docs.lib.purdue.edu/lars_symp

Chagarlamudi, P.; Schubert, J. S.; and Mack, A. R., "Mapping Growing Conditions of Crops from Landsat Data" (1980). *LARS Symposia*. Paper 343.
http://docs.lib.purdue.edu/lars_symp/343

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

Reprinted from

Symposium on

Machine Processing of

Remotely Sensed Data

and

Soil Information Systems

and

Remote Sensing and Soil Survey

June 3-6, 1980

Proceedings

The Laboratory for Applications of Remote Sensing

Purdue University
West Lafayette
Indiana 47907 USA

IEEE Catalog No.
80CH1533-9 MPRSD

Copyright © 1980 IEEE
The Institute of Electrical and Electronics Engineers, Inc.

Copyright © 2004 IEEE. This material is provided with permission of the IEEE. Such permission of the IEEE does not in any way imply IEEE endorsement of any of the products or services of the Purdue Research Foundation/University. Internal or personal use of this material is permitted. However, permission to reprint/republish this material for advertising or promotional purposes or for creating new collective works for resale or redistribution must be obtained from the IEEE by writing to pubs-permissions@ieee.org.

By choosing to view this document, you agree to all provisions of the copyright laws protecting it.

MAPPING GROWING CONDITIONS OF CROPS FROM LANDSAT DATA

P. CHAGARLAMUDI AND J. S. SCHUBERT

The Sibbald Group Division of Deloitte Haskins & Sells Associates, Canada

A. R. MACK

Research Branch, Agriculture Canada, Canada

ABSTRACT

An automatic method of mapping crop growing conditions from Landsat data has been developed. The method uses only current Landsat data and yield models derived from historical Landsat and crop phenology data. These models have been developed for spring and winter wheat in the Northern Hemisphere environment. The maps are useful to marketing, international service and relief organizations in estimating domestic and foreign yields of major crops.

Growing conditions of crops are often evaluated by ground observation of the density of plants in grain fields. Landsat data were used in this study to estimate these densities. The method is based on the fact that a dense or closed green-vegetative canopy absorbs more incident radiation in Landsat Band 5 and reflects more in Band 7 than an open or sparse canopy. The densities were determined quantitatively by comparing the ratio of Band 7 to Band 5 intensities in standardized Landsat digital data to standard values for canopies of different densities. A biomass index is then calculated to express quantitatively the vegetation density of a sample area (10 km²). These biomass indices are translated into yield estimates for wheat using regression models.

Maps showing the distribution of growing conditions of spring and fall seeded wheat by 10 km² areas within five Crop Districts have been used to estimate composite yields for wheat in these districts for the past five growing seasons. These estimates were within $\pm 10\%$ of the reported yield for each District. The yield estimates for the 10 km² sample areas were even closer to the reported yields for these areas.

CH1533-9/80/0000-0121 \$00.75 © 1980 IEEE